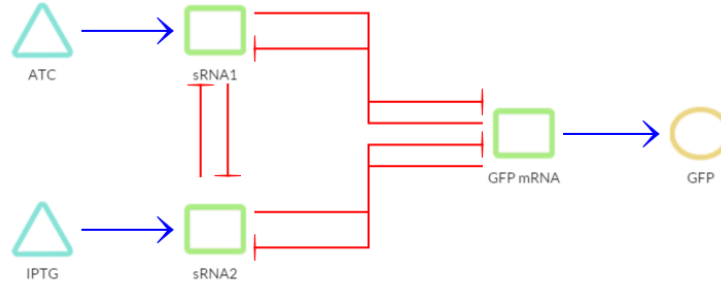


Biosensor-ratio sensor and comparator



Formulae for two certain parts

sRNA1 and sRNA2:

$$\frac{d[sRNA1]}{dt} = \alpha_{s_1} - k_s [sRNA1][sRNA2] - \beta_{s_1} [sRNA1]$$

sRNA1 and GFP mRNA:

$$\frac{d[sRNA1]}{dt} = \alpha_{s_1} - k_{m_1} [sRNA1][m] - \beta_{s_1} [sRNA1]$$

sRNA2 and GFP mRNA:

$$\frac{d[sRNA2]}{dt} = \alpha_{s_2} - k_{m_2} [sRNA2][GFP \text{ mRNA}] - \beta_{s_2} [sRNA2]$$

sRNA2 and sRNA1:

$$\frac{d[sRNA2]}{dt} = \alpha_{s_2} - k_s [sRNA2][sRNA1] - \beta_{s_2} [sRNA2]$$

GFP mRNA and sRNA1:

$$\frac{d[GFP \text{ mRNA}]}{dt} = \alpha_m - k_{m_1} [sRNA1][GFP \text{ mRNA}] - \beta_m [GFP \text{ mRNA}]$$

GFP mRNA and sRNA2:

$$\frac{d[GFP \text{ mRNA}]}{dt} = \alpha_m - k_{m_2} [sRNA2][GFP \text{ mRNA}] - \beta_m [GFP \text{ mRNA}]$$

ATc and sRNA1:

$$\alpha_{s_1} = \alpha_{s_{10}} \frac{[ATc]^n}{k_1^n + [ATc]^n}$$

IPTG and sRNA2:

$$\alpha_{s_2} = \alpha_{s_{20}} \frac{[IPTG]^n}{k_2^n + [IPTG]^n}$$

Formulae for numerical simulation

GFP:

$$\frac{d[\text{GFP}]}{dt} = \alpha_{GFP}[\text{GFP mRNA}] - \beta_{GFP}[\text{GFP}]$$

Parameter Table

Parameters	Values and Units
K _s	5 /nM*min
K _{m1}	6/nM*min
K _{m2}	8/nM*min
K ₁	1
K ₂	1
Beta _{s1}	0.2/min
Beta _{s2}	0.2/min
Beta _m	0.05/min
Beta _{GFP}	0.05umol/min
Alpha _{GFP}	0.06umol/min
Alpha _m	30nM/min
Alpha _{s10}	20nM/min
Alpha _{s20}	20nM/min
n	2

Reference: <http://2012.igem.org/Team:OUC-China>